

No. 650,881



ISSUED Oct. 23, 1962
CLASS 273-65

CANADIAN PATENT

GLIDING DEVICE

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Granted to Olin Mathieson Chemical Corporation, New York, New
York, U.S.A.

APPLICATION No. 774,975
FILED May 21, 1959
PRIORITY DATE

No. OF CLAIMS 5

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SOS-400-S-1 (REV. 6/62)

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This invention relates to water or snow skis, skids, surf boards, runners, and the like and more specifically to water skis.

Heretofore, equipment of this type has been constructed generally of wood and has been subject to various disadvantages. For one thing, wooden skis and boards require considerable care and maintenance such as painting or waxing in order to preserve them in operable condition and particularly to preserve their surface smoothness. When used continuously for a long time, they absorb water and may warp or crack. Unless kept reasonably dry, they may become water logged and their buoyancy for use on water may be impaired. Moreover, in the event of freezing of a wet ski, splitting may occur. Unless made of adequate thickness, splitting may also occur, as well as undesirable flexing. Metal articles of this type heretofore have not become common because of the flexing, lack of buoyancy, excessive weight when rigid enough and the resulting clumsiness.

Therefore, it is an object of this invention to provide new and improved articles of this type which are light and durable in construction, but at the same time, of adequate strength. Still another object is to provide surf boards, skis and the like of economical manufacture. Other objects and advantages will become apparent from a description of various specific embodiments illustrated in the accompanying drawings in which:

Fig. 1 is a perspective view of a water ski in accordance with one embodiment of this invention:

Fig. 2 is a cross sectional view taken on line

II-II of Fig. 1;

Fig. 3 is a cross sectional view corresponding to Fig. 2, but of another embodiment;

Fig. 4 is a cross sectional view corresponding to Fig. 2, but of a still further embodiment;

Fig. 5 is a bottom view of another embodiment; and

Fig. 6 is a cross sectional view taken on line VI-VI of Fig. 5.

In accordance with this invention, skis and surf boards are constructed of cavitated sheet material having longitudinally extending hollow sections between portions of the material distended to extend as longitudinal ribs from at least one side of the surface of the sheet. A type of material specifically contemplated in preference to others is that made in accordance with Grenell U.S. patent 2,690,002 to which reference should be made. For the purpose of this invention the material is a light metal characterized by hardenability. Aluminous metal and preferably a precipitation hardenable alloy has been found especially suitable giving the skis both light weight and added strength. A typical material is one alloy commonly known as Alloy 6061 in the form of a sheet having a gage of 0.100 of an inch or less, but preferably, a gage of from 0.070 to 0.080 of an inch. This has been found to be of proper rigidity, while still having a desirable degree of flexibility for the purpose of this invention.

Various articles of this type of various sizes are contemplated. Water skis in particular, which usually have a length of not less than 48 inches and generally of about

66-70 inches and the width of at least 4 inches and usually from 6-8 inches, may advantageously be made with air cavities of a size not less than that adequate to float the skis.

5 To construct such skis, for example, a stop-weld pattern of any suitable weld preventing metal is graphically applied between two component sheets of aluminous metal which are thereafter fixed in super-position with the juxtaposed surfaces suitably treated as by scratch brushing and finally when so fixed hot forged as by rolling to form a unitary ski
10 blank. The blank is then further processed to provide it not only with a conventional turned up toe, rudder, if any, and an adjustable and flexible foot binding of well known rubber or plastic construction, but also with hollows and ribs and preferably with a particularly advantageous
15 peripheral construction in the form of a flange free from sharp edges. When finally shaped, it is hardened.

The pattern of stop-weld material adapts the blank to inflation whereby portions of the sheet blank are distended from its surface to form an externally grooved internally
20 cavitated sheet structure in accordance with this invention.

A plurality of longitudinal distentions, preferably two, are provided. The resulting hollow construction increases the section modulus and rigidity of the ski while leaving some desirable degree of flexibility. The hollow
25 in the case of water skis also provides sufficient buoyancy. The resulting external longitudinally corrugated or ribbed configuration is also of advantage in providing a guiding, rudder, or keel effect together with a catamaran effect. Although the stabilizing effect of the latter is evident
30 with a plurality of cavities, especially with two cavities

there is obtained a pronounced so-called "twin-hull" effect which may be accentuated by sharply ridging the underlying wall of each cavity (see Figures 5 and 6). The hollow construction of the skis may be such as to provide distentions on both the upper and lower surfaces, largely on the upper or lower surfaces, or to a greater extent at certain portions of either surface. With water skis in particular corrugation of the lower surface is desirable. With snow skis, a smooth lower surface with shallow side grooving is desirable, so that a series of lengthwise grooves in the bottom are of some advantage. With the "twin-hull" construction of this invention, deeper grooving together with a greater ridge-like extension may be provided at the bottom of the heel of the skis to obtain a more pronounced built-in keel or rudder effect eliminating skidding especially at high speed turns. The two large cavities as compared to more small ones, give the greatest buoyancy.

This all-metal construction, being free from the graining of wood and its proclivity to splitting, is adaptable to successful inclusion of an extremely simple but fully adaptable foot binding having no more than two manual fasteners as shown.

In the embodiment of Figures 1 and 2, the ski includes the hollow sheet metal body 1, the left hollow float section 2, the right hollow section 3, the turned up toe 4, the closed heel 5, the left side flange and roll crimp 6, right side flange and roll crimp 7, the foot binding member 8, readily and adjustably fastened in any suitable manner as by a simple pair of manually operable fasteners 9. As shown in Figure 2, the hollow sections 2 and 3 form

distentions or corrugations on the external surface of the body in a longitudinal direction. The edge crimps 6 and 7 form a smooth rolled side edge which are of the type shown extending upwardly and all around the periphery and of rather large radius. For water skis this construction avoids shipping of water and any sharp cutting edge. For the purpose of adding an additional keel effect part of the side flanges may be dependent adjacent the heel 5. For snow skis the lateral metal edges are made somewhat sharper to help bite in for making turns.

The foot binding 8 adapted for this ski construction includes a front platform having one of the plastic knurled wheel fasteners 9 and a rear platform having the other fastener. Both binding platforms are held in line adjustably with respect to each other at the interdigital expansion joint 10.

In the embodiment of Figure 3, a greater number of grooves and hollow sections such as 11, 12, 13, and 14 are provided in the body 15. A series of such grooves may be advantageous especially in surf boards and snow skis.

In Figure 4, the distentions 21, 22, and 23 are formed only on the upper surface of the body 25 and the lateral edges 26 and 27 are uncrimped and relatively sharp, but turned down to give a gripping effect. This embodiment is especially suitable for snow skis. Without the turned down edges it is suitable for trick water skis needing a flat bottom.

In the embodiment of Figure 5, the hardened aluminum alloy ski body 31 is of a construction similiar to the embodiment of Figures 1 and 2 at the front end. The

hollow sections 32 and 33 and side edges 36 and 37 in cross section are substantially identical with the cross section shown in Figure 2. This embodiment differs in being tapered in width and being narrower at the heel for better stability and manoeuverability especially for water skiing. The heel section is provided with a greater and more sharply extended distentions or ribs 42 and 43, as shown in Figure 6, and with the downward flanges 56 and 57. These make a more pronounced rudder or keel effect.

In manufacture a roll forged blank, having a suitable stop-weld pattern including an inlet 51 and a common connection 52 at an expendable rear end section 50, is first provided. Next the blank is positioned between suitable dies and press platens, preferably spaced and shaped to not only govern the fluid pressure distention, but also to form the upturned toe and the edges of the ski. The die may be further padded or grooved to form greater extensions of the distentions as at the heel or on one surface as compared with the others. After shaping by fluid pressure inflation, with fluid admitted at inlet 51 through diamond-shaped nozzles, for example, from the common header 52, section 50 is cut off, and the hollows are closed at one end at the heel by swaging and soldering to trap air in them. When of final finished shape, the body of the ski is age hardened. Anodizing and impregnation of the oxide layer with a water repellent such as wax is contemplated and advantageous. The layer may also be dyed to color the skis.

It will be appreciated that the articles of this invention have many advantages not obtainable in articles of this type heretofore available. They are of all metal

construction of suitable lightness and strength. Being
of metal, the skis will not splinter or warp and no paint
is required, although they may be buffed, anodized and
waxed. In snow skis, the metal construction provides
5 integral metal edges for biting in on turns. For water
skis, the hollow construction insures not only that the
skis float, but that they have adequate strength and keel
action. The articles may be aircraft skids.

Although various specific embodiments now
10 believed to be preferred have been described, it will be
understood that other embodiments, changes, and modifica-
tions may be made by those skilled in the art without
departing from the spirit and scope of the invention as
set forth in the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A gliding device comprising a substantially flat and solid integral sheet of light metal having substantially planar surfaces and containing a plurality of laterally spaced and closed elongated cavities extending in longitudinal rows within said sheet, said cavities being separated by solid portions of said sheet extending between adjacent cavities, with all said cavities being distended externally beyond the plane of at least one surface of said sheet to form bulges thereon, and a forward portion of said sheet turned upwardly to form the forward end of said device.

2. A gliding device comprising a substantially flat and solid integral sheet of light metal containing a plurality of laterally spaced and closed elongated cavities extending in longitudinal rows within said sheet with the end rows laterally of said sheet spaced a substantial distance from the edges of said sheet, with all said cavities being distended externally beyond the plane of at least one surface of said sheet to form bulges thereon, and a forward portion of said sheet turned upwardly to form the forward end of said device.

3. A gliding device for use as a ski comprising superimposed complementary thin elongated sheets of light metal welded together at laterally spaced rows, longitudinally extending unwelded intermediate portions between said rows, with said intermediate portions being distended to form cavities between the upper and lower surfaces of said sheet, a forward portion of said welded sheets turned upwardly to form the forward end of said ski, and foot mounting means

secured to the upper surface of said ski rearwardly of said forward portion.

4. The article of Claim 3 wherein said sheets are selected from alloys of aluminum.

5. A gliding device composed of a single solid elongated sheet of metal having within its outer surfaces a plurality of narrow substantially parallel spaced cavities, with the walls of said cavities extending outwardly as ribs on at least one surface of said device, and a forward portion of said sheet turned upwardly to form the forward end of said device, and foot mounting means secured to the upper surface of said device rearwardly of said forward portion, said cavities having a fluid sealed therewithin and being substantially uniformly positioned from the edges of said sheet.

X

FIG. 1

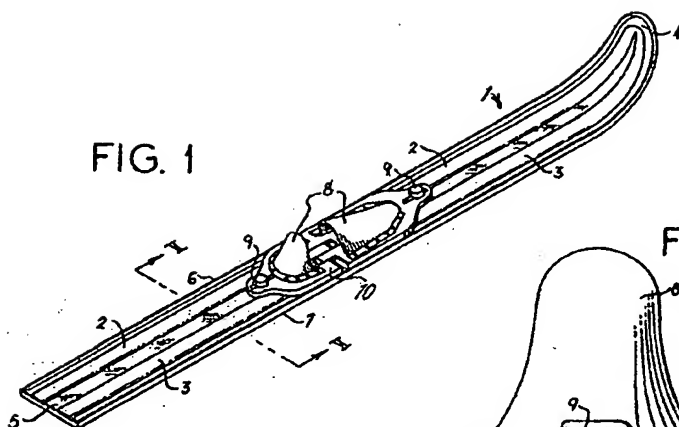


FIG. 2

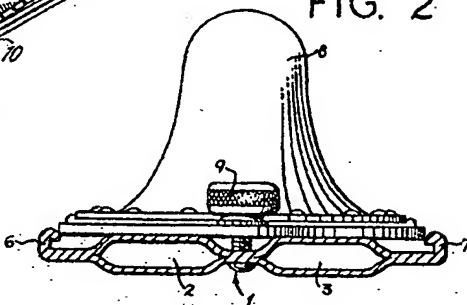


FIG. 3

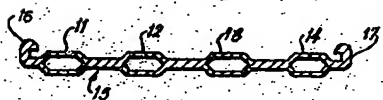


FIG. 4



FIG. 5

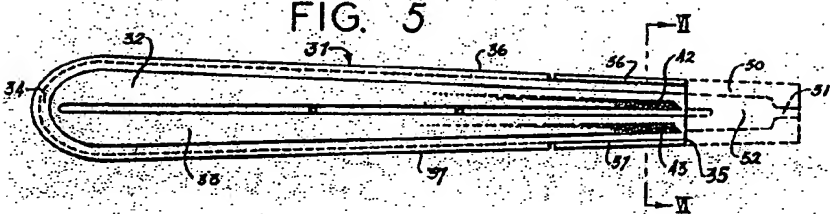
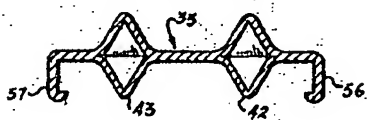


FIG. 6



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PATENT AGENTS

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